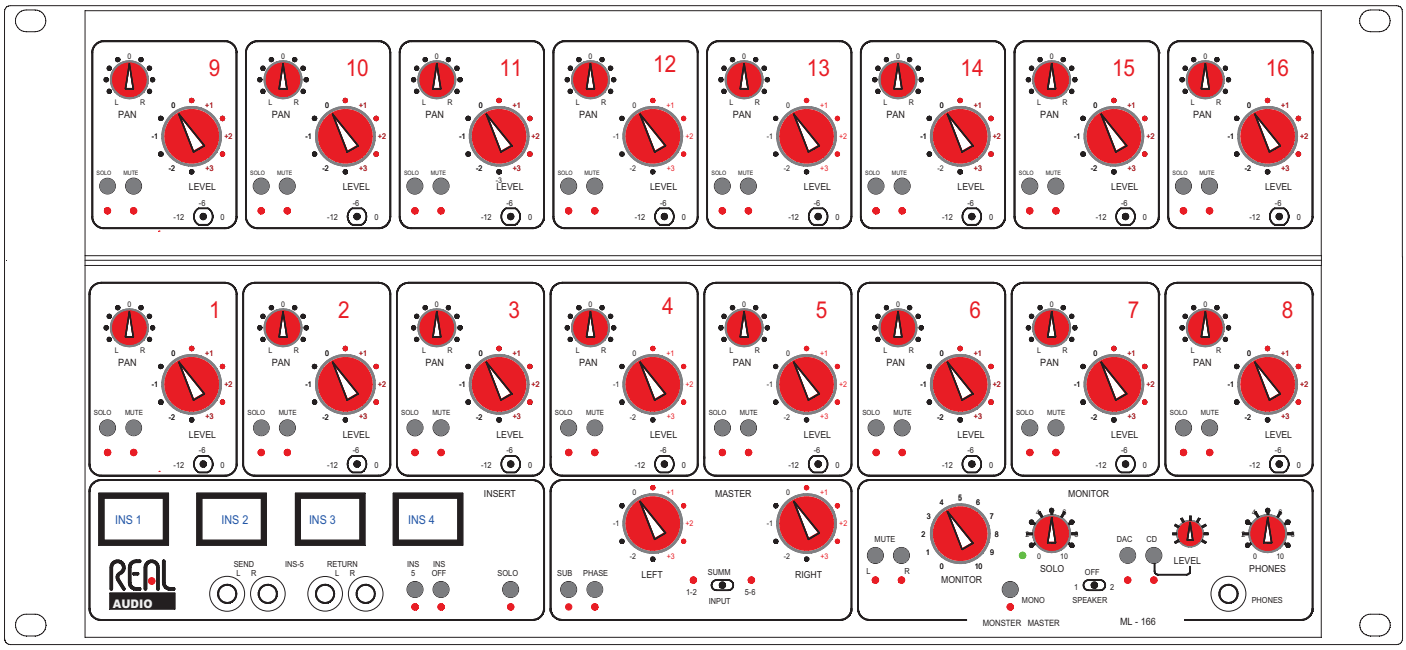
REAL Innovation

ML-166/16
16 Channel Summing Mixer



User Manual

Issue 0.1

SAFETY INSTRUCTIONS

⚠ *WARNING*

Always follow the precautions listed below to avoid any possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

- Do not expose the instrument to liquids and rain. Do not use it near water or in damp or wet conditions, or place containers on it containing liquids. If any liquid seeps turn off the power and unplug the power cord from the AC outlet.
- Do not put burning items, such as candles, on the unit. A burning item may fall over and cause a fire.
- This instrument contains no user-serviceable parts. Do not open the instrument or attempt to disassemble or modify the internal circuit.
- Never insert or remove an electric plug with wet hands.
- Check the electric plug periodically and remove any dirt or dust which may have accumulated on it.
- Do not place the power cord near heat sources such as heaters or radiators, and do not excessively bend or otherwise damage the cord, place heavy objects on it, or place it in a position where anyone could walk on, trip over, or roll anything over it.

⚠ *CAUTION*

Always follow the precautions listed below to avoid any possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

- Do not connect the instrument to an electrical outlet using a multiple-connector. Doing so can result in lower sound quality, or possibly cause overheating in the outlet itself.
- When removing the electric plug from the instrument or an outlet, hold the plug itself and not the cord. Pulling by the cord can damage it.
- Remove the electric plug from the outlet when the instrument is not to be used for extended periods of time, or during electrical storms.
- Do not place the instrument in an unstable position where it might accidentally fall over.
- Before moving the instrument, remove all connected cables.
- When setting up the product, make sure that the AC outlet you are using is easily accessible. If some trouble or malfunction occurs, immediately turn off the power switch and disconnect the plug from the outlet. Even when the power switch is turned off, electricity is still flowing to the product at the minimum level.
- When you are not using the product for a long time, make sure to unplug the power cord from the wall AC outlet.
- Use only the stand/rack specified for the instrument. When attaching the stand or rack, use the provided screws only. Failure to do so could cause damage to the internal components or result in the instrument falling over.

Information for Users on Collection and Disposal of Old Equipment

This special symbol on the products, packaging, and/or accompanying documents means that used electrical and electronic products should not be mixed with general household waste.
For proper treatment, recovery and recycling of old products, please take them to applicable collection points, in accordance with your national legislation and the Directives 2002/96/EC.
By disposing of these products correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.
For more information about collection and recycling of old products, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.
[For business users in the European Union]
If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.
[Information on Disposal in other Countries outside the European Union]
This symbol is only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.

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REAL Audio is continuously working to the improvement of its systems and related documentation.
In any case, we reserve the right to change the specifications without notice but in the respect to the current legislation.

Disclaimer:
The information contained in this manual has been carefully checked and we believed is accurate at the time of publication.
In any case, we do not assume any responsibility for inaccuracies, errors or omissions nor any liability for any loss or damage resulting either directly or indirectly from use of the information contained in this manual.

TABLE OF CONTENTS

SAFETY INSTRUCTIONS 2
REAL Audio Contacts 3
TABLE OF CONTENTS 4
INTRODUCTION 5
Housing 7
ML-166/16 Front Panel Controls and Operations 8
INPUT SECTION 8
Input section gain knob 8
Input section pan knob 8
Input section solo button 8
Input section mute button 8
Input attenuator switch 8
Insert section 9
Monitor section 9
SOLO KNOB 9
SOLO LED 9
MONITOR KNOB 9
MUTE L/R BUTTONS 9
MONO BUTTON 10
Speaker switch 10
Dac button 10
Cd button 10
Level knob 10
Phones knob 10
Headphones TRS jack 10
Master section 11
Sub button 11
Phase button 11
Left and rigth master volume knobs 11
Master section in/out selector 11
ML-166/16 Back Panel Controls and Operations 11
INPUT XLR 11
INPUT DB 25 (1 and 2) 11
MAIN L/R OUT 11
MONITOR OUT 12
SEND/RETURN 1 and 2 12
OUTPUT DB 25 12
APPENDIX A: Connections 13
APPENDIX B: Front Panel 14
APPENDIX C: Back Panel 15
TECHNICAL SPECIFICATIONS 17

INTRODUCTION

REAL Audio Monster Master ML-166/16 is the answer to all stream mixing and mastering needs. Its features set it apart from other similar products on the market: each of the 8 mixing channels has an 11-step rotary switch for panning, a 12-step rotary switch for level (going from +3dB to -2.5dB in 0.5dB increments), an input attenuation selection button (0dB, -6dB or -12dB) and mute and solo buttons.

The solo function is particularly useful as it works even if the channel is muted: signal is fed to the bus after the pan rotary switch to allow a correct and precise stereo positioning of each signal for each channel. The master section has two master level rotary switches that allow a 3dB-increase or decrease of the output level in steps of 0.5dBs. The internal summing section is totally symmetric (balanced) and built with highest quality components to guarantee maximum signal transparency and quality. The resulting noise is 10 to 12dB lower than other summing mixers.

A specific additional feature of the Monster Master is the “Summing Bypass” function, which is extremely useful for mastering an already mixed stereo track. This option allows selective feeding of channels 1 and 2 or 5 and 6 and not the entire summing output to the mastering section. This further reduces noise coming from unused tracks. When channels 1 and 2 or 5 and 6 are directly fed to the mastering section, the level and pan controls for these channels are bypassed and a unitary gain is used. Changing the internal jumper setup can easily restore the effect of the level control rotary switch.

The Monster Master is the “All-in-one” solution for the mixing and mastering engineer who do not accept compromises in sound quality and that want maximum flexibility and reliability. An exceptionally robust frame houses only the best available non-custom and non-SMD components.

Each channel can be accessed by two different input connectors (DB25 and XLR) allowing hassle-free connections to professional DAW via a standard 8 channel multicore cable (DB25 to DB25) as well as single-channel external device insertion via an XLR cable.

Following the summing stage is an insert point for connecting external units such as equalizers and compressors that can be bypassed with a front panel button. This insert connection, electronically balanced for both send and return, can be accessed either from the DB25 and XLR rear connectors or via front panel jacks. This feature is particularly useful when a main external unit (connected via the rear panel) needs to be momentarily replaced by another device quickly.

The use of the send/return front panel jacks automatically disables the corresponding rear panel connected device. The send signal on the front panel jacks is always present allowing the set-up of the levels for the outboard connected by the front panel jacks. The connection of the return cable will exclude the main outboard connected to the DB25 connector on the back panel. Therefore a unit can be connected to the front panel jacks maintaining the main insert on the back panel.

Used in conjunction with mic preamplifiers, the **ML-166/16** is the ideal mixer for engineers working in studios not equipped with a classic analog console who do not want to use digital mixers. For this reason, a different ML-166/16 version characterized by a level control range of -20dB/+6dB is also available.

ML-166/16 is dedicated (due to his absolute sonic level quality) to high professional vocal recordings, classical instruments, high dynamic range instruments such as drums and percussions.

REAL Audio products are designed and manufactured in Italy.

Housing

The **ML-166/16** is contained in a 5U rack metal box. No specific air conditioning is required for the racks, provided that there is a free flow of air through the rack from front to back and the temperature is maintained in the operating range. Consequently the racks may be stacked.

ML-166/16 Front Panel Controls and Operations

INPUT SECTION (CHANNELS 1-16)

INPUT SECTION GAIN KNOB

Rotate the level knob to change the gain. The level is controlled by a 300° potentiometer allowing a range of 14 dB (-12dB to +2dB, +6dB to -20dB version available) (Fig.1). Rotate the rotary switch from to change the input gain. Twelve positions are available (+3dB to -2.5dB in 0.5dB increments).

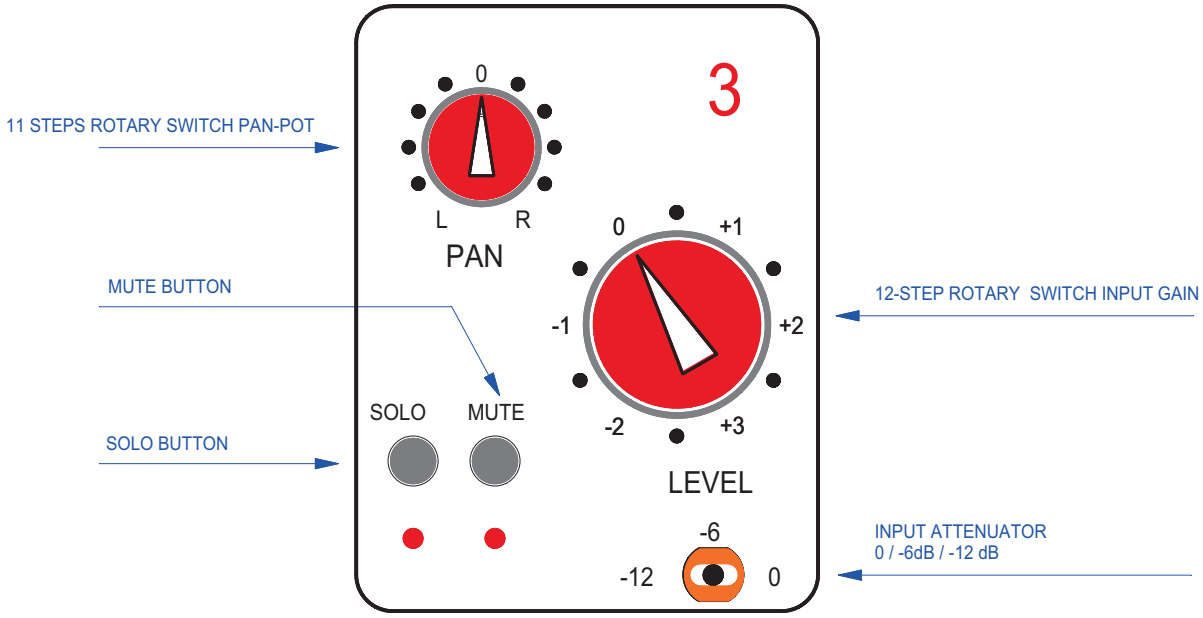

Fig. 1 ML-166/16 Input Section

INPUT SECTION PAN KNOB

This is a -3.75 dB centre pan, with S-Law shaping to help accurate panning to extremes of left and right. The pan knob controls an 11 steps rotary switch.

INPUT SECTION SOLO BUTTON

Press the solo button (green LED on) to isolate the channel. Press again to turn-off the solo function (green LED off) (Fig. 1).

INPUT SECTION MUTE BUTTON

Press the mute button (red LED on) to turn off the channel. Press again to turn-on the channel (red LED off) (Fig. 1).

INPUT ATTENUATOR SWITCH

This three positions switch selects the input attenuation value between three values -12/-6 and 0 dB.

Insert section

Push the back illuminated buttons to select the main inserts (Fig. 2). Insert 5 can be selected by pressing INS 5. Insert 5 can be connected by using the jacks on the front panel.
Press INS OFF button to exclude all the inserts.
Press the SOLO button to monitor the pre insert audio signal.

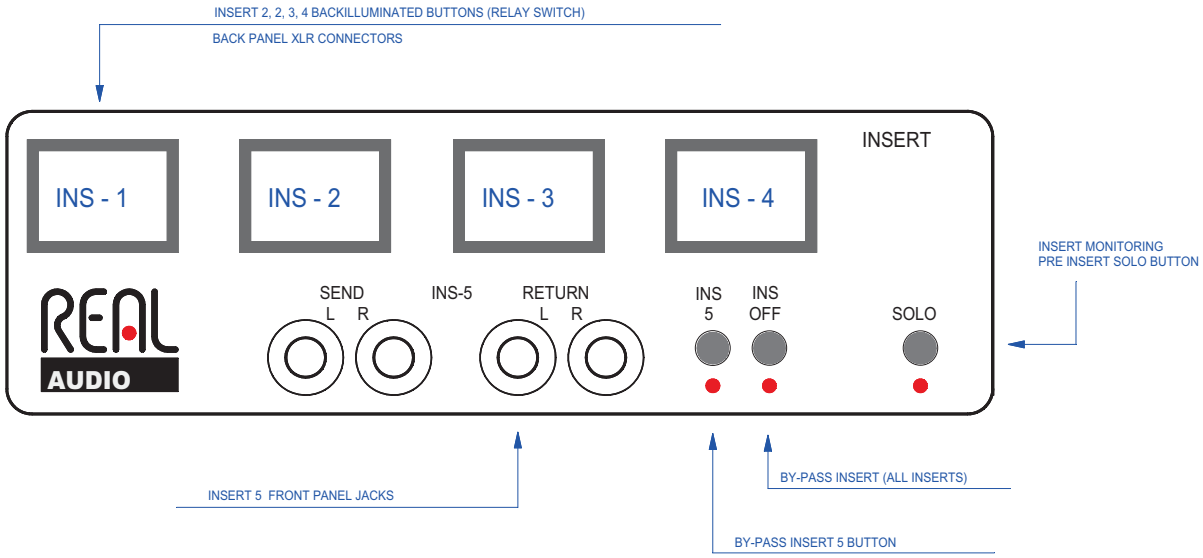

Fig. 2 ML-166/16 Insert Section

Monitor section

SOLO KNOB

Turn the SOLO gain knob (Fig. 3) in order to select the required amount of gain for the SOLO bus.

SOLO LED

The green LED on means that the SOLO function is activated.

MONITOR KNOB

Turn the MONITOR gain knob (Fig. 2) in order to select the required amount of gain for the monitor outputs.

MUTE L/R BUTTONS

Push the MUTE L or MUTE R button to mute the L or the R channel (red LEDs on). Press again to switch off the MUTE L/R function (red LEDs off).

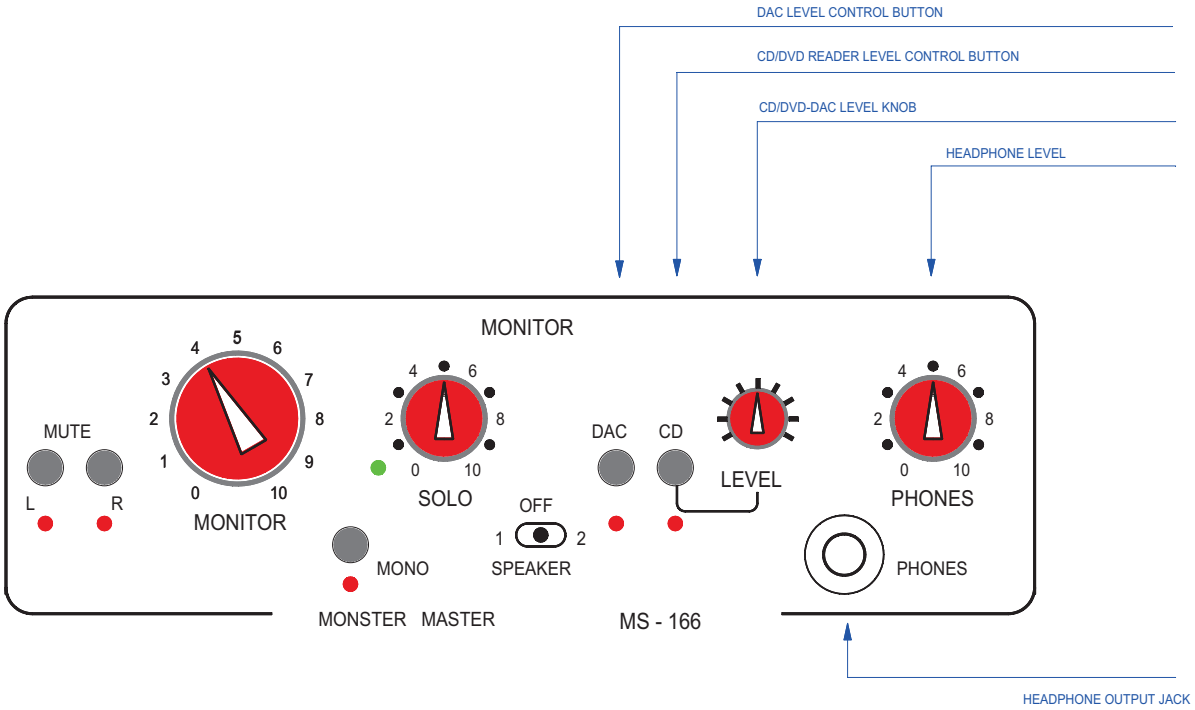

Fig. 3 ML-166/16 Monitor Section

MONO BUTTON

Push the button to obtain a single mono output (red LED on). Press again to switch off the MONO function (red LED off).

SPEAKER SWITCH

Select one of the three positions of the SPEAKER toggle switch (Speaker 1, OFF, Speaker 2) to select the speaker system.

DAC BUTTON

Push the button to select the DAC input (red LED on). Press again to disconnect the DAC input (red LED off).

CD BUTTON

Push the button to select the CD/DVD input (red LED on). Press again to disconnect the CD/DVD input (red LED off).

LEVEL KNOB

Rotate the knob to change the level of the selected input source.

PHONES KNOB

Rotate the knob to change the headphone volume.

HEADPHONES TRS JACK

Connect the headphone to this TRS jack. The headphone amplifier is able to drive headphones with impedance > 50Ω.

Master section

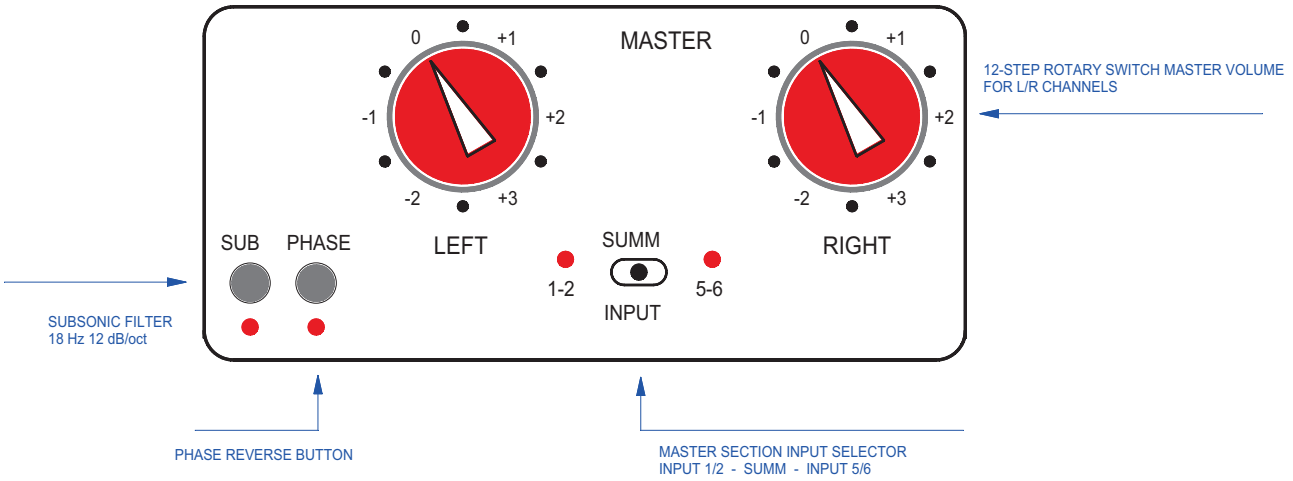

Fig. 3 ML-166/16 Master Section

SUB BUTTON

Push the button to activate the subsonic filter (red LED on). Press again to deactivate the filter (red LED off).

PHASE BUTTON

Push the button to activate the PHASE REVERSAL (red LED on). Press again to deactivate the function (red LED off).

LEFT AND RIGTH MASTER VOLUME KNOBS

Rotate the L and R knobs to adjust the master level. 12 positions are available (Rotary switch) from +3dB to -2.5dB in 0.5dB increments

MASTER SECTION IN/OUT SELECTOR

Select one of the three positions of the INPUT switch (1/2, SUMM,5/6) to select the input channels.

ML-166/16 Back Panel Controls and Operations

INPUT XLR

The 16 XLR female connectors for the input channels are clustered ion two groups of 8.

INPUT DB-25 (1 AND 2)

Two DB-25 can also be used for the input channels connections. Each DB25 accommodate 8 input channels (occorre mettere il cabling)

MAIN L/R OUT

XLRs for the L/R main output.

MONITOR OUT

XLRs for the L/R monitor output

SEND/RETURN 1 AND 2

XLRs for the send/return 1 and 2.

OUTPUT DB-25

The output DB-25 connector is used to simplify the output connections by a using a signle multicore cable. (Fig. XXX)

APPENDIX A: Connections

FIG. 1 ML-166/16 Connections

APPENDIX B: Front Panel

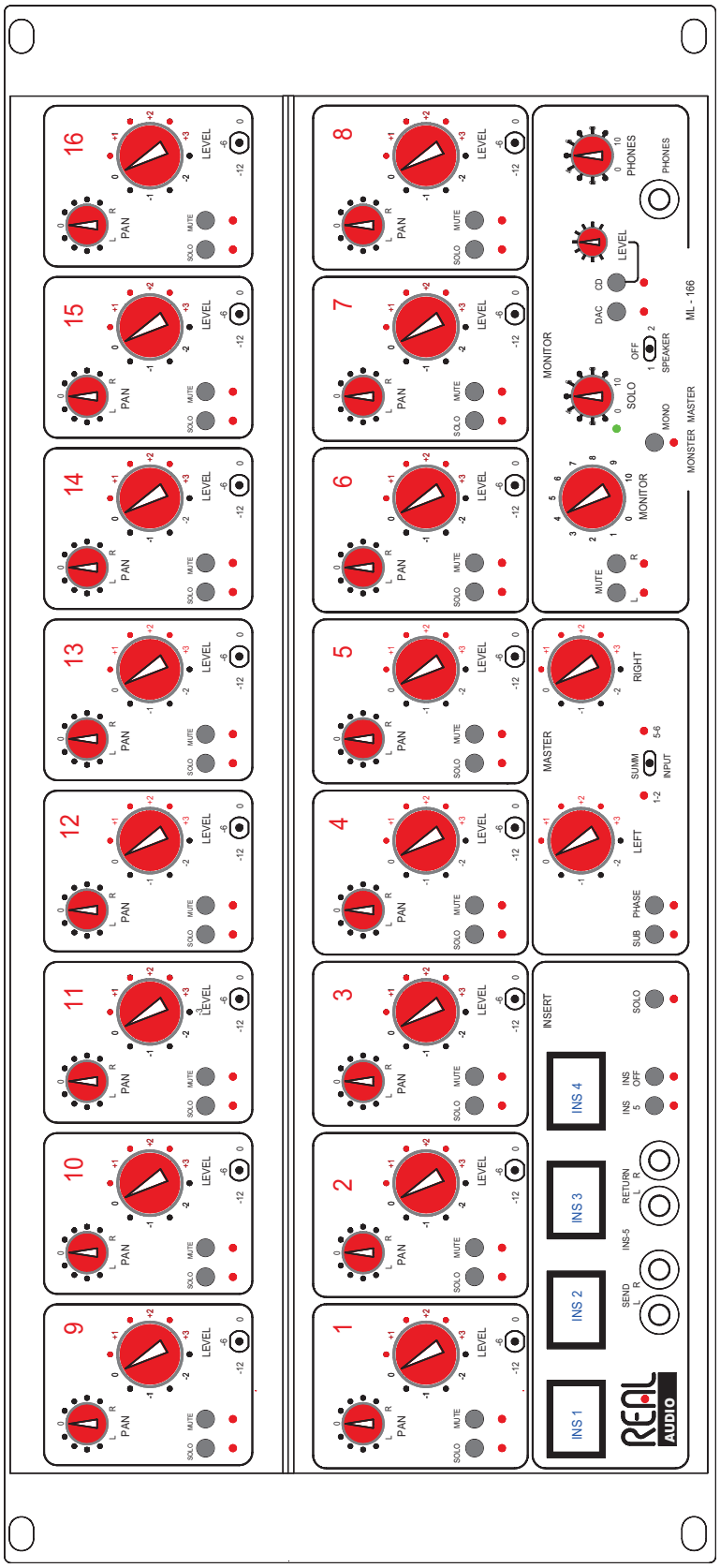

FIG. 3 ML-166/16 Front Panel

APPENDIX C: Back Panel

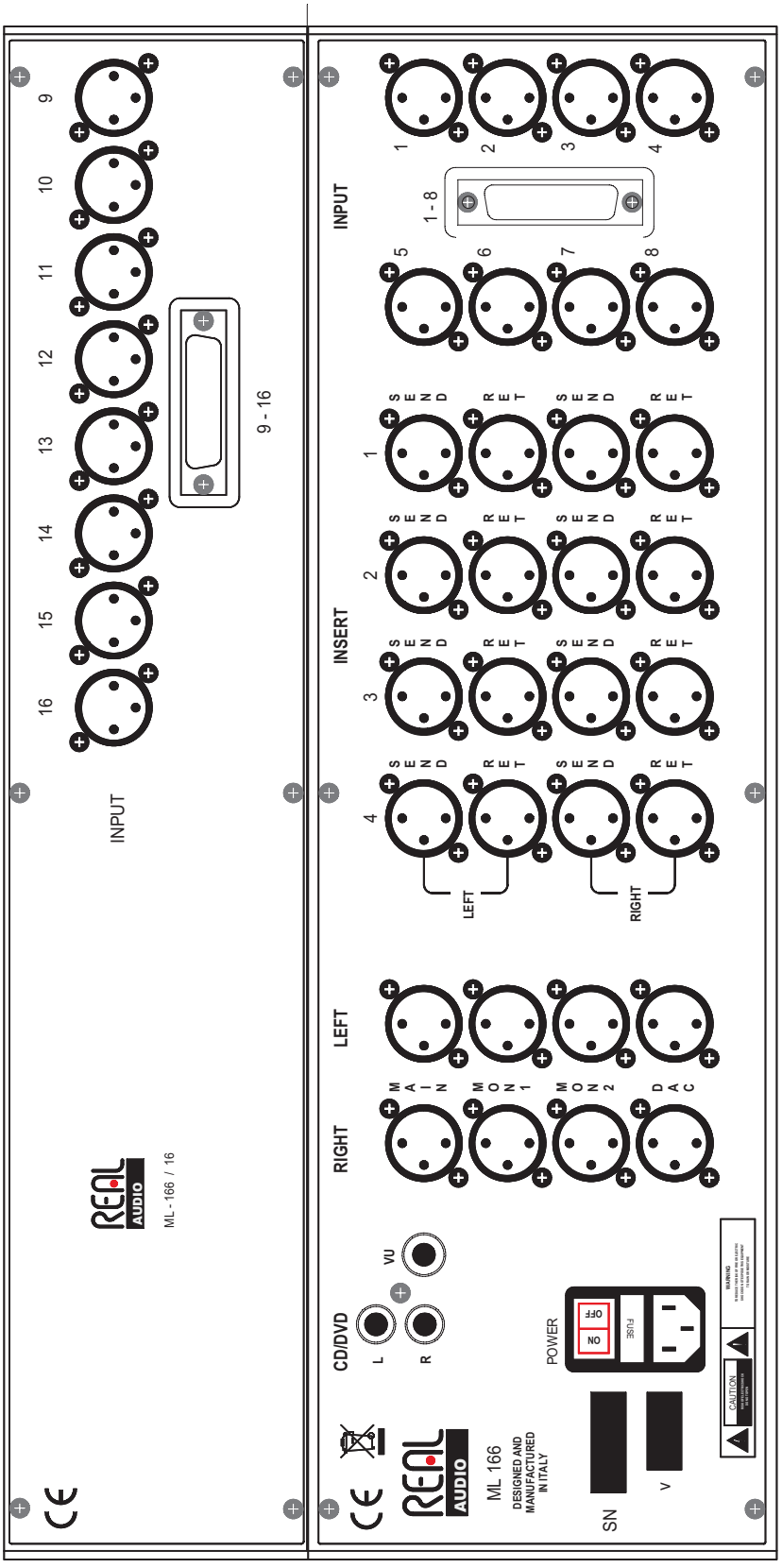

Fig. 4 ML-166/16 Back Panel

APPENDIX C: Input and Output DB-25 connectors

TECHNICAL SPECIFICATIONS

Number of Channels	16
Power Supply	Linear Regulator (Balanced C-Core Transformer)
Operating Voltage	220V 50 Hz/ 110 V 60 Hz switchable
Power Consumption	50 W
Input	Electronically balanced, Level +4 dBu max +24 dBu Impedance > 10 KΩ
Channel Gain	12-step level rotary switch from +3dB to -2.5dB in 0.5dB increments with input attenuator selection switch (0dB or -6dB or -12dB)
Master Output	Electronically balanced, Output Impedance 50 Ω (minimum external load 600Ω)
Master Level	Level +4dBu, Max +29dBu, 12-step level rotary switch from +3dB to -2.5dB in 0.5dB increments
Master Sub filter	20 Hz 12 dB/Oct Slope
DAC Input	Stereo, Line level +4dBu max +24dBu, balanced, Imp. >10kΩ
CD Input	Stereo. Level -10dBu, Imp. >10kΩ, unbalanced
Bandwidth	5 - 200.000 Hz -1dB, perfect square wave up to 20 KHz
Distortion + Noise	<0.005% (typical 0.001 %)
Front Panel Controls (each channel): Input Section	12-step rotary switch from for level control (+3dB to -2.5dB in 0.5dB increments), 3 positions input attenuation switch (0dB or -6dB or -12dB), 11-Step pan rotary switch. 2 x buttons for mute and solo
Front Panel Controls: Insert Section	4 x backlighted buttons (INSERT 1 to 4 enable). 3 x buttons (Insert 5, Insert OFF, Solo)
Front Panel Controls: Master Section	2 x 12-step level rotary switch, (+3dB to -2.5dB in 0.5dB steps) for L/R Channels 2 x buttons (Subsonic Filter, Phase) Toggle switch input mode (1+2, Sum, 5+6)
Front Panel Controls: Monitor Section	4 x pots (Monitor, Solo, CD-level, Headphones) 5 x buttons (Mute L, Mute R, Mono, DAC, CD) 3-way toggle switch speaker mode (Speaker 1, OFF, Speaker 2)
Front Panel Indicators	Input Section (each channel): Insert Section: yellow LED (Solo), red LED (Mute), Master Section:4 x backlighted button (INS 1-4), 2x red LEDs (INS 5, INS off), yellow LED (Solo), Monitor Section: 3x red LED (Mute L, Mute R, Mono), 2X green LED (DAC, CD)
Front Panel Connnectors	4 x 1/4” TRS jack for INSERT 5 (send L-R, return L-R), 1 x 1/4” stereo jack for headphones Imp. >50Ω
Rear Panel Input	8 x Balanced XLR female (Ch1 to Ch8)

Connectors	DB25 female (Ch1 to Ch8), 2 x Balanced XLR female (DAC input), 2x RCA (CD/DVD input)
Rear Panel Output Connectors	6 x Balanced XLR male (Main, Mon 1, Mon 2). 1/4” jack stereo VU meter connection
Rear Panel Insert Connectors	8 x Balanced XLR female: Send 1 to 4 (LEFT), Send 1 to 4 (RIGHT) 8 x Balanced XLR male: Return 1 to 4 (LEFT), Return 1 to 4 (RIGHT)
Main Switch	Power On/Off switch
Rear Panel AC mains	IEC C13 16 A connector, AC mains cord with IEC Schuko 16A
Construction	19" 5U rack mount metal box
Dimensions	W 483 mm / 19”, H 225.25 mm/1.75” (1 RU), D 225 mm / 8.86”
Weight	9 kg